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Standards Support and Environmental Impact Statement Volume II: Promulgated Standards of Performance for Kraft Pulp Mills

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STANDARDS SUPPORT AND ENVIRONMENTAL IMPACT STATEMENT - VOLUME II: PROMULGATED STANDARDS OF PERFORMANCE FOR KRAFT PULP MILLS

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Waste Management
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

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15. SUPPLEMENTARY NOTES
Volume 2 summarizes the public comments on the proposed standards, EPA responses, and a discussion of differences between the Proposed and Promulgated Standards.

16. ABSTRACT

Standards of performance for the control of emissions of total reduced sulfur (TRS) and particulate matter from new and modified kraft pulp mills are being promulgated under the authority of section 111 of the Clean Air Act. TRS emissions from kraft pulp mills are extremely odorous, and there are numerous instances of poorly controlled mills creating public odor problems. The promulgated standards will prevent odor problems from most newly constructed kraft pulp mills, except in the immediate vicinity of the mills on occasions when meteorological conditions produce downwash of stack plumes. Particulate matter emissions from new mills will be reduced by more than 99 percent below the levels that would result from no control and more than 50 percent below the average State standards. Emissions of TRS will be reduced by more than 95% below the uncontrolled levels and more than 80 percent below the average levels for existing sources. An analysis of the significant changes in the environmental and economic effects associated with the promulgated standards is included in this document.

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Emission Standards and Engineering Division

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Kraft Pulp Mills

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1. SUMMARY

On September 24, 1976, the Environmental Protection Agency (EPA) proposed standards of performance for kraft pulp mills (41 FR 42012) under the authority of section 111 of the Clean Air Act. Public comments were requested on the proposal in the Federal Register publication. Forty-two comment letters were received from pulp and paper industry representatives, State air pollution control agencies, other Federal agencies, manufacturers and vendors of pulping equipment, and individual U. S. citizens. The comments that were submitted along with responses to these comments are summarized in this document. This summary of comments and responses serves as the basis for the revisions which have been made to the standards between proposal and promulgation.

1.1 SUMMARY OF CHANGES SINCE PROPOSAL

Limits of the Standards

Four revisions were made to the numerical limits included in the proposed standards of performance for kraft pulp mills. The major revision is the development of a separate TRS numerical emission limit of 25 ppm for cross recovery furnaces. The other revisions were basically concerned with the method of expressing the emission limits and are, therefore, considered minor.

The first of these other changes is that in determining TRS emissions from recovery furnaces and lime kilns, correction of the TRS readings to a specified excess oxygen concentration is now required in all cases.

The second change concerns the units of TRS and particulate standards for smelt dissolving tanks. The promulgated standards have been revised to grams per kilogram of black liquor solids (dry weight).

The final change concerns the TRS standard for lime kiln emissions. The promulgated standard limits TRS emissions to 8 ppm.

Monitoring and Excess Emissions

Four revisions have been made to the continuous monitoring requirements and excess emission allowances. Two of these revisions are concerned with continuous monitoring and two involve excess emission allowances.

The first revision with regard to continuous monitoring is that section 60.13 of the General Provisions for Subpart 60 has been amended so that the TRS and oxygen continuous monitoring requirements will not become effective until promulgation of performance specifications for TRS monitors. The second revision concerns the TRS monitoring requirement when gases from the digesters, brown stock washers, multiple-effect evaporators, black liquor oxidation, or condensate stripper are combusted in a separate incinerator. The promulgated standards require monitoring of TRS emissions in some instances as opposed to monitoring of firebox temperature in all cases.

The two revisions with respect to the excess emission allowance concern TRS emissions from recovery furnaces and lime kilns. The excess emission reporting requirements for recovery furnaces now include an excess emission allowance of 1 percent. The excess emission reproting requirements for lime kilns, on the other hand, no longer provide an excess emission allowance.

Testing

Two revisions have been made to Test Method 16. The method has been rewritten to allow greater flexibility in the selection of equipment for use in testing, and correction of the results to account for sampling loss and sulfur dioxide interference is now required.

1.2 SUMMARY OF THE ENVIRONMENTAL IMPACTS

Alternatives to the Promulgated Action

The alternative control systems are discussed in chapter 4 of the Standards Support and Environmental Impact Statement (SSEIS, Vol. 1). These alternative systems are based upon combinations of the best demonstrated technology, considering costs, for the control of TRS and particulate emissions at kraft pulp mills. The analysis of the alternative of taking no action and of postponing the promulgated action is outlined in chapter 7 (SSEIS, Vol. 1). These alternatives remain the same.

Environmental Impact of the Promulgated Action

Primary Impact

Two changes to the regulation since proposal affect the primary impact on the reduction of TRS emissions from kraft pulp mills. The rationale for these changes is given in chapter 2. First, a TRS standard for recovery furnaces which burn combined liquors from neutral sulfite semichemical (NSSC) pulping and kraft pulping--normally termed "cross recovery"--was established at 25 ppm. The impact of these changes, however, is expected to be negligible since there are only 11 cross recovery furnaces now in operation and very few new cross recovery furnaces are anticipated during the next ten years. All other new, modified, and reconstructed recovery furnaces will be subject to the standard of 5 ppm.

Second, the final standard for lime kilns allows 8 ppm of TRS. The impact of this change is expected to be negligible since the same control system will have to be used under the final standard as under the proposed standard. The change is based on a reevaluation of the same data as was used to establish the proposed emission limit.

Table 1-2 if chapter 1 of the SSEIS, Vol. 1, contains a summary of the environmental impacts associated with implementation of the proposed standards. This matrix will not change as a result of these two revisions to the proposed standards.

Secondary Impact

Table 7-1 of the SSEIS, Vol. 1, presents a summary of the secondary environmental impacts attributable to the alternative control systems. These secondary impacts remain unchanged for the promulgated standards of performance.

Economic Impact of the Standard

In accordance with Executive Orders 11821 and 11949 and OMB Circular A-107, the economic and inflationary impacts of the proposed standard and the alternative control levels were carefully evaluated. This economic impact analysis is contained in chapter 8 of the SSEIS, Volume 1. Significant comments on this analysis and responses to these comments are presented in chapter 2 of this document. Since the changes which were made to the proposed standard do not affect the level of control required, the economic impacts of the promulgated standard and alternative control levels are essentially the same as described for the proposed standard.

Other Considerations

Adverse Impacts

The potential adverse impacts associated with these standards are discussed in chapters 1 and 7 of the SSEIS, Vol. 1. These impacts remain unchanged since the regulations were proposed.

Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enforcement of Long-Term Production

This impact is discussed in chapters 7 and 9 of the SSEIS, Vol. 1, and remains unchanged since proposal.

Irreversible and Irretrievable Commitments of Resources

This impact is discussed in chapter 7 of the SSEIS, Vol. 1, and remains unchanged since proposal.

2. SUMMARY OF THE PUBLIC COMMENTS

The list of commenters and their affiliations is shown in Table 2-1. Forty-two letters were received commenting on the proposed standards and Vol. 1 of the Standards Support and Environmental Impact Statement. The significant comments have been combined into the following five major areas:

1. Impacts of the Proposed Standards
2. Emission Control Technology
3. Continuous Monitoring and Excess Emissions
4. Emission Testing
5. Miscellaneous

The comments and issues, along with responses to these comments are discussed in the following sections of this chapter. A summary of the changes to the regulation is included in section 2 of chapter 1.

2.1 IMPACTS OF THE PROMULGATED STANDARDS

Impact on Existing Sources

Several comments were received from industry representatives, State agencies and kraft pulp mill operators expressing concern over the impact of standards of performance on existing sources. Among the general areas of concern were: (a) the stringency of EPA's guidelines for the control of existing sources compared to the standards of performance for new sources and (b) the impact of the standards on modified and reconstructed facilities.

EPA's guidelines for existing sources under section 111(d) of the Act, which are to be proposed in the near future, are in some cases as stringent as the standards of performance for new sources. In other cases, however, higher emission rates are recommended. The proposed guidelines are considered

to be both technologically and economically reasonable based on an analysis of available emission control technology and the cost of retrofitting this technology into existing sources.

A 60-day comment period is provided to allow the public an opportunity to comment on the proposed guidelines. Since TRS emissions have been determined to be a welfare-related pollutant, States will have considerable flexibility in establishing regulations limiting these emissions from existing kraft pulp mills located within their jurisdictions. In developing their regulations, States are free to balance the emission guidelines and the information provided in the guideline document against other factors of public concern in establishing requirements for specific existing kraft pulp mills. Hence, there may be conditions under which the regulations adopted by States for existing sources would be more lenient than those included in the proposed guidelines.

The specific areas of concern expressed in the comments which were directed toward the impact of the standard on modified or reconstructed sources were: (1) that the impact of the standards would curtail modernization and expansion of existing mills, (2) the extent to which an increase in emissions would require a modified facility to comply with the standards, and (3) whether the addition of a batch digester or a change in the fuel fired in a lime kiln would be considered modifications.

As most commenters recognized, existing facilities within a kraft pulp mill will not be subject to the standards unless they are modified or reconstructed. Thus, the impact of the standards on various modernization or expansion projects depends on the extent to which existing facilities within a kraft pulp mill are modified or reconstructed. Alteration of an existing

facility will only be considered a modification if emissions released to the atmosphere from the mill taken as a whole increase following the alteration. Alteration of an existing facility which requires an expenditure equal to 50 percent or more of the total cost of installing a new facility identical to the altered facility, however, will be considered a reconstruction.

Prior to the proposal of the standards of performance, the potential impact of the standards on a variety of possible modernization or expansion projects within existing kraft pulp mills was assessed. As discussed in the Standards Support and Environmental Impact Statement (SSEIS) supporting the proposed standards, with two exceptions, the economic impact associated with requiring each of the modified or reconstructed facilities in these projects to comply with the standards of performance was considered reasonable. Consequently, this impact would not affect the overall decision to modernize or expand an existing kraft pulp mill. While the various projects that were analyzed are by no means the only ways by which existing kraft pulp mills can modernize or expand, they are illustrative of the types of projects that normally occur. Consequently, they are viewed as broadly representative of modernization or expansion projects in general, and are considered a reasonable basis from which conclusions can be drawn regarding the potential impact of the standards on these projects.

The two exceptions mentioned above, where the impact of requiring modified or reconstructed facilities to comply with the standards was considered unreasonable, were modification or reconstruction of the black liquor oxidation and brown stock washer systems at existing kraft pulp mills. These two exceptions were considered necessary due primarily to the potential safety hazard posed by combustion of the high volume-low TRS concentration waste gases discharged from these facilities in existing recovery furnaces that

were not designed to accommodate these gases. Furthermore, since the costs associated with the retrofit of an existing recovery furnace or installation of a new incinerator to combust these gases could also be prohibitive, an exemption was included in the proposed standards, and is also included in the promulgated standards, which recognizes that there are mills where the existing facility cannot be used to incinerate the waste gas streams from these facilities. Consequently, where a brown stock washer system or black liquor oxidation system is added, modified, or reconstructed at such a mill, the owner or operator may request an exemption from the standard until such time as the mill acquires the capability to successfully incinerate the gases from these facilities.

There were a few questions regarding the extent to which an "increase in emissions" which would subject a modified facility to the new source performance standards. As pointed out above, only an increase in emissions to the atmosphere from a kraft pulp mill taken as a whole is used to judge the occurrence of a modification. Therefore, when an existing facility is altered, if emissions released to the atmosphere from the facility following the alteration do not increase or if any emissions increase from the altered facility are balanced off by an emission decrease elsewhere within an existing kraft pulp mill, the altered facility will not be considered a modified facility, even where emissions from the altered facility exceed the standards.

If an altered facility is considered a modified facility due to an increase in emissions of a specific air pollutant, such as TRS or particulate matter, the facility would only be subject to compliance with the standard for that specific pollutant. Therefore, if an existing lime kiln were to be modified with a resulting increase in particulate emissions, the

kiln would be subject only to the standard for particulate matter but not subject to the standard for TRS emissions. In other words, modification with regard to one pollutant does not require that the facility meet the standards for all pollutants.

With regard to the question of whether the addition of a batch digester to an existing group of digesters at a pulp mill would be considered a modification of the digester system, the answer is no. Since the digester system is defined in the standards to mean each separate continuous or batch digester, the addition of a batch digester would be considered as the installation of a new affected facility, not modification of an existing facility. As a result, only the new batch digester would be required to comply with the standards of performance.

The situation would be different, however, in the case of black liquor oxidation systems and multiple-effect evaporator systems. These systems are not defined in the standards in terms of each oxidizing tank or evaporator, but in terms of the system as a whole. Consequently, installation of additional stages of black liquor oxidation or multiple-effect evaporation would be considered potential modifications or reconstructions of these systems, not as the installation of new affected facilities.

One commenter suggested that due to energy considerations, a fuel switch from natural gas to oil in a lime kiln be excluded from consideration as a modification or reconstruction to encourage a shift from natural gas firing within existing kraft pulp mills. A shift from natural gas to oil is expected in many existing facilities. An analysis of this situation, however, indicates that the costs of controlling particulate emissions from a modified or reconstructed lime kiln to the level required by the particulate emission

standard is reasonable. Consequently, a shift from natural gas to oil within existing lime kilns will be considered potential modifications.

Economic Impact

Numerous comments were received on the economic impact of the proposed standards of performance for kraft pulp mills. In general, these comments concerned either the overall impact of the proposed standards or the cost of specific emission control equipment.

With regard to the overall impact of the standards, the commenters were mainly concerned about two points: (a) that the proposed standards of performance would inhibit further growth in the industry by increasing the operating costs associated with new mills well beyond those of well-controlled, presently operating mills; and (b) that the failure to base the economic analysis on the total costs of all air, water, noise and other non-revenue-producing investments seriously understated the full impact of the standards on the industry.

EPA does not agree that the standards will inhibit growth within the kraft pulp industry. The impact of the standards on the capital and operating costs associated with kraft pulp mills was considered in depth in the SSEIS. Because of the relatively small control costs and a market characterized by price inelastic product demand, the resulting impact on return on investment is small. Consequently, the promulgated standards will not preclude construction of new facilities, or modification or reconstruction of existing facilities.

Although the total cost of pollution control affects expansion decisions, all of these costs cannot be attributed to the standards of performance. The impact associated with standards of performance is only due to the additional emission control required by these standards above what is currently required by existing State and local air pollution control regulations. After all, in the absence of standards of performance, new, modified, or reconstructed

facilities would still have to comply with existing control requirements. Consequently, only the impact resulting from the incremental costs associated with the additional TRS and particulate emission control required by the standards of performance above that required by existing State or local requirements was assessed in developing these standards.

With regard to the costs associated with specific emission control technologies, the main concern of the commenters was the cost associated with maintenance of electrostatic precipitators on recovery furnaces. As discussed in the SSEIS, however, precipitator manufacturers indicate that better precipitators can be built at an increase in capital cost of about 15 percent. This will significantly reduce the maintenance requirements to prevent deterioration. Accordingly, the costs for electrostatic precipitators on recovery furnaces in the SSEIS were increased to reflect this conclusion.

Environmental Impact

Three main areas of concern were expressed by commenters regarding the potential environmental impacts associated with the standards: (a) the net environmental impact of caustic addition to the scrubber on the lime kiln, (b) the alleged failure of EPA to prepare an Environmental Impact Statement, and (c) the increased energy usage which would result from compliance with the standards of performance.

A number of commenters indicated their belief that the addition of caustic to the lime kiln scrubber would not reduce the ambient air TRS concentration levels over that obtained without caustic and would impose a solid waste penalty. Therefore, they concluded that caustic was not worth the increased cost.

Addition of caustic to the lime kiln scrubber will not significantly reduce the maximum ambient air TRS concentrations. As discussed in the SSEIS,

however, there are two benefits associated with the addition of caustic to the scrubber which outweigh the small increase in cost: a substantial decrease in the radius of the influence of odors around a kraft pulp mill and a significant reduction in nationwide emissions of TRS over the next five years. With regard to the potential solid waste problem, if solids filtration and recycle of the scrubbing liquid are used, solid waste impacts will be negligible.

One commenter expressed the opinion that the use of Appendix B of the SSEIS as a cross reference to environmental impact considerations was inconsistent with EPA's procedures for the preparation of a voluntary Environmental Impact Statement (39 FR 37419). This is not true. The SSEIS is considered a complete document identifying alternative actions and incorporating an analysis of environmental impacts associated with these alternatives, which is the primary objective of Environmental Impact Statements. Accordingly, the SSEIS is consistent with EPA's stated policy.

With respect to the increased energy consumption which would result from compliance with the standards of performance, the industry was concerned that this would conflict with the Department of Energy's goal to reduce total energy consumption in the pulp and paper industry by 14 percent.

The standards will increase the difficulty of attaining this energy reduction goal. This factor was considered in the analysis of the energy impact associated with the standards and is discussed in the SSEIS. The 4.3 percent increase in energy usage by kraft pulp mills is reasonable, however, in comparison to the benefits which would result from the corresponding reduction in TRS and particulate matter.

As discussed in the section of this chapter concerning emission control technology, the promulgated standards include a TRS numerical emission

limit of 25 ppm for cross recovery furnaces. The environmental impact of this revision is expected to be minimal since there are only eleven cross recovery furnaces presently in operation. Very few new cross recovery furnaces are projected for construction over the next 10 years.

2.2 EMISSION CONTROL TECHNOLOGY

Most of the comments received regarding emission control technology concerned the application of this technology to either lime kilns or recovery furnaces. A few comments, however, expressed concern with the use of the oxygen correction factor included in the proposed standards for both lime kilns and recovery furnaces. These commenters pointed out that adjusting the concentration of particulate matter and TRS emissions to 10 percent oxygen for lime kilns and 8 percent oxygen for recovery furnaces only when the oxygen concentration exceeded these values effectively placed more stringent standards on the most energy-efficient operators. To ensure that the standard is equitable for all operators, these commenters suggested that the measured particulate matter and TRS concentrations should always be adjusted to 10 percent oxygen for the lime kiln and 8 percent oxygen for the recovery furnace.

Although these comments are valid, within limits, the lower the oxygen concentrations of the gases from any combustion operation, the more energy efficient the operation generally is and the lower the gas volume released. Requiring a lime kiln or recovery furnace with a low oxygen concentration to meet the same emission concentration as a lime kiln or recovery furnace with a high oxygen concentration, therefore, would effectively place a more stringent emission limit on the kiln or furnace with the low oxygen concentration. Consequently, the promulgated

standard requires correction of particulate matter and TRS concentrations to 10 percent or 8 percent, as appropriate, in all cases.

Lime Kiln

Numerous comments were received regarding the proposed TRS standard for lime kilns. In general, these comments questioned: (a) the basis for the TRS standard, (b) the numerical emission limit included in the TRS standard, and (c) the ability to comply with both the TRS standard and the particulate emission standard simultaneously.

More specifically, with regard to the basis for the TRS standard, the commenters questioned: (1) whether caustic scrubbing is effective in reducing TRS emissions from lime kilns, (2) the wisdom of basing the standard on operations observed at one lime kiln; (3) whether an over-design of the mud washing facilities at lime kiln E was responsible for the lower TRS emissions observed at this lime kiln; and (4) the ability of existing lime kilns that might be affected by the standard to add caustic to the lime kiln scrubbers without creating a sodium imbalance within the chemicals recovery system.

The effectiveness of caustic scrubbing is substantiated by comparison of TRS emissions during brief periods when caustic was not being added to the scrubber at lime kiln E, with TRS emissions during normal operation at lime kiln E when caustic was being added to the scrubber. These observations clearly indicated that TRS emissions would be higher if caustic was not used in the scrubber. The ability of caustic scrubbing to reduce TRS emissions is also substantiated by the experience of another kraft pulp mill which was able to reduce TRS emissions from its lime kiln from 40-50 ppm to about 20 ppm merely by adding caustic to the lime kiln scrubber. These factors, coupled with the emission data showing higher TRS emissions from those lime kilns which employed only

efficient mud washing and good lime kiln process control, clearly show that caustic scrubbing does reduce TRS emissions.

While no other lime kiln in the United States is currently achieving the TRS emission levels observed at lime kiln E, there is no other lime kiln in the United States which is using the emission control system employed at this facility, and upon which the TRS emission standard is based (i.e. efficient mud washing, good lime kiln process operation, and caustic scrubbing). As discussed in the SSEIS, an analysis of the various parameters influencing TRS emissions from lime kilns indicates that this system of emission reduction could be applied to all new, modified, or reconstructed lime kilns and achieve the same reduction in emissions as observed at lime kiln E. Section 111 of the Clean Air Act requires that standards of performance reflect the degree of emission reduction achievable through the application of the best system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated for that category of sources. Litigation of standards of performance has resulted in clarification of the term "adequately demonstrated." In Portland Cement Association v. Ruchelshaus (486 F. 2nd 375, D.C. Circuit, 1973), standards of performance were viewed by the Court as "technology-forcing." While a system of emission reduction must be available for use to be considered adequately demonstrated, it does not have to in routine use. Consequently, the emission control system installed at lime kiln E is considered "adequately demonstrated" and this system is the basis for the promulgated TRS standard for lime kilns.

The mud washing facilities at lime kiln E are indeed larger than those at other kraft pulp mills of equivalent pulp capacity. This "overdesign" resulted from initial plans of the company to process lime mud from wastewater treatment. These wastewater treatment plans were later abandoned. Since the quality or efficiency of mud washing has been shown to be a significant factor in reducing TRS emissions from lime kilns, the larger mud washing facilities at lime kiln E undoubtedly contribute to the low TRS emissions observed at this kiln. With the data available, however, it is not possible to separate the relative contribution of these mud washing facilities, from the relative contribution of good process operation of the lime kiln and caustic scrubbing to the low TRS emissions observed.

In those few cases where existing lime kilns will have to comply with the TRS standard, addition of caustic to the lime k n scrubber should not result in a sodium imbalance within the chemicals recovery system. Some change in the purge and chemical make-up rates might be required, but no major problems should arise. Lime kiln E, for example, was an existing lime kiln to which caustic scrubbing was a case of retrofit. No major problems in maintaining the sodium balance in the chemicals recovery system were experienced.

As shown by the continuous monitoring data obtained from lime kiln E, TRS emissions occasionally exceeded 5 ppm during normal operation. While these excursions in emissions cannot be directly related to any specific parameter, they are not the result of improper operation or maintenance of either the emission control system or the kraft pulp mill, but reflect

the unavoidable day-to-day variability inherent within the kraft pulping process. This variability was reflected in the proposed standard by the 6 percent excess emissions allowance which was included within the emission monitoring requirements for continuous monitoring of TRS emissions from lime kilns.

Although the TRS emission test data gathered from lime kiln E supported a numerical emission limit of 5 ppm, these data consisted of only one EPA emission test of lime kiln E and one company emission test of this facility. In light of this limited data base and the fact that lime kiln E is the only facility within the domestic kraft pulp mill industry which has installed the emission control system selected as the basis for the standard, the TRS continuous emission monitoring data from lime kiln E were analyzed to ensure that a numerical emission limit was selected which was consistent with proper operation and maintenance of this emission control system on lime kiln E. This analysis indicated that an emission source test of lime kiln E could have found TRS emissions above 5 ppm greater than 5 percent of the time. This analysis also indicated, however, that it was very unlikely that an emission source test of lime kiln E would have found TRS emissions above 8 ppm. Thus, it appeared that the 5 ppm TRS numerical emission limit included in the proposed standard for lime kilns was too stringent. Accordingly, the numerical emission limit included in the promulgated TRS standard for lime kilns has been revised to 8 ppm. As discussed later in this chapter, consistent with this change in the numerical emission limit, the excess emissions allowance included within the emission monitoring requirements has been eliminated.

This does not reflect a change in the basis for the standard. The standard is still based on the best system of emission reduction, considering

costs, for controlling TRS emissions from lime kilns (i.e., efficient mud washing, good lime kiln process operation, and caustic scrubbing). This system, or one equivalent to it, will still be required to comply with the promulgated standard.

Finally, with regard to the ability of a lime kiln to comply with both the TRS emission standard and the particulate emission standard simultaneously, caustic scrubbing will tend to increase particulate emissions due to release of sodium fume from the scrubbing liquor. Compared to the concentration of particulate matter permitted in the gases discharged to the atmosphere, however, the potential contribution of sodium fume from caustic scrubbing is quite small. Consequently, with proper operation and maintenance, sodium fume due to caustic scrubbing would not cause particulate emissions from a lime kiln to exceed the numerical emission limit included in the promulgated standard.

As a number of commenters pointed out, particulate emissions from lime kiln E exceeded the numerical emission limit included in the standard. This was not due to caustic scrubbing, however, but was due to the low pressure drop at which the scrubber operated. As discussed in the SSEIS, the standard is based on the use of a venturi scrubber with a pressure drop of 0.076 kg/cm^2 (30 in.). If the scrubber at lime kiln E operated at this pressure drop, this kiln would meet both the TRS emission standard and the particulate emission standard simultaneously.

Recovery Furnaces

A number of comments were received regarding both the proposed TRS emission standard and the proposed particulate emission standard for recovery furnaces.

With regard to the proposed TRS standard, the comments questioned whether it was reasonable to expect each of the different types of recovery

furnaces to meet the proposed TRS numerical emission limit on a continuing basis. Most of the concern expressed in these comments focused on direct-contact recovery furnaces, older recovery furnaces, hardwood pulp mill recovery furnaces, and cross recovery furnaces.

With the exception of cross recovery furnaces, there is no justification to support separate TRS numerical emission limits for each of the different types of recovery furnaces mentioned above. The subject of direct-contact versus indirect-contact recovery furnaces, for example, was explored in depth in the Standards Support and Environmental Impact Statement (SSEIS). No additional information or data was submitted with the comments which would alter this assessment of the ability of these two types of recovery furnaces to reduce TRS emissions to the level of the standard.

With regard to older recovery furnaces, TRS emission source test data obtained from recovery furnaces, which had been in operation for some 10 years, were less than 5 ppm indicating that this furnace could achieve the standard. As discussed in the Draft Guideline Document for Control of TRS Emissions from Existing Kraft Pulp Mills, however, the "old design" recovery furnace is usually not able to reduce TRS emissions to less than 5 ppm at reasonable cost. This problem stems from the basic design of these furnaces which inherently leads to higher TRS emissions. Since this furnace design became outmoded about 1965 there should be no major problems associated with reducing TRS emissions from new recovery furnaces of this type.

Additionally, as discussed in the previous section dealing with lime kilns, existing recovery furnaces will only become subject to the TRS standard of performance if they are modified or reconstructed. Alteration of an existing recovery furnace would ha. to result in increased TRS

is 5 ppm. These data did, however, indicate that an excess emission allowance should be included within the continuous monitoring requirements associated with straight kraft recovery furnaces. Accordingly, as discussed later in this chapter, the promulgated TRS standard for straight kraft recovery furnaces has been revised to include a 1 percent excess emission allowance.

With regard to cross recovery furnaces, a number of commenters expressed concern about the ability of the best system of emission reduction to reduce TRS emissions to 5 ppm when applied to these furnaces. In support of this concern, one commenter submitted several months of TRS continuous emission monitoring data from an indirect-contact cross recovery furnace which showed TRS emissions considerably in excess of 5 ppm most of the time.

Review of these data and additional information submitted with these comments indicate that the operation of cross recovery furnaces is substantially different from that of straight kraft recovery furnaces. The sulfidity of the black liquor fired in cross recovery furnaces and the heat content of the liquor, both of which are significant factors influencing TRS emissions, are considerably different from the levels found in straight kraft recovery furnaces.

An examination of the cross recovery furnace from which the continuous monitoring data submitted with the comments had been obtained indicated that this furnace employed good process operation to reduce TRS emissions, and that this system was generally well operated and maintained. An examination of the TRS emission monitoring system also indicated that it was well operated and maintained. Consequently, the continuous monitoring emission data submitted with the comments was accepted as an accurate record of TRS emissions from a well controlled and well operated cross recovery furnace.

from the kraft pulp mill as a whole to be considered a modification. As discussed in the SSEIS, alteration of existing recovery furnaces is not likely to lead to increased TRS emissions. Consequently, very few existing recovery furnaces will be modified and become subject to compliance with the TRS emission standard.

No TRS emission source test data were obtained from hardwood pulp mill recovery furnaces during development of the proposed standards. Discussions with recovery furnace manufacturers and state air pollution control agencies, however, indicate that hardwood recovery furnaces are achieving TRS emissions below 5 ppm on a continuous basis without any unusual difficulty.

Before discussing the comments concerning cross recovery furnaces, the other aspect of these comments, which questioned the abi'ity of recovery furnaces to achieve the proposed TRS numerical emission limit on a continuing basis, should be addressed. Several months of TRS continuous emission monitoring data were submitted by the operator of recovery furnace D showing occasional excursions of TRS emissions above 5 ppm. As discussed in the SSEIS, this facility is a direct-contact recovery furnace which employs good process operation of the recovery furnace and black liquor oxidation to reduce TRS emissions (i.e. the best system of emission reduction, considering costs). An inspection of the TRS continuous emission monitoring system indicated that it was properly operated and maintained and produced an accurate record of TRS emissions.

Analysis of these continuous emission monitoring data did not indicate that a TRS numerical emission limit greater than 5 ppm should be selected for recovery furnaces. Consequently, the TRS numerical emission limit included in the promulgated standard for straight kraft recovery furnaces

A review of these data indicated that TRS emissions were generally less than 25 ppm, with only occasional excursions exceeding this level. Consequently, the promulgated TRS emission standard has been revised to include a separate TRS numerical emission limit of 25 ppm for cross recovery furnaces.

With regard to the ability of recovery furnaces to comply with the proposed particulate and visible emission numerical emission limits, the comments questioned: (1) whether electrostatic precipitators, which were the basis for the standard could reduce particulate emissions to the level required by the proposed standard; (2) whether it was possible to design electrostatic precipitators to comply with a visible emissions limit; and (3) usefulness of the visible emission standard since opacity is a function of stack diameter.

The ability of electrostatic precipitators to reduce emissions to the level included in the proposed particulate emission standard for recovery furnaces was examined at length in the SSEIS. Emission source test data from four recovery furnaces, supplemented with additional data and information from manufacturers of electrostatic precipitators, clearly indicate that, with proper operation and maintenance, precipitators will reduce particulate emissions to below the standard on a continuing basis. No additional data or information was submitted with the comments which indicates this assessment is incorrect. Consequently, the proposed particulate emission standard was not revised for promulgation.

Electrostatic precipitators, or for that matter any particulate emission control device, are not designed specifically to reduce the opacity of visible emissions to a certain level. They are designed to reduce particulate emissions to a certain level. The opacity of visible emissions, however, is related

to particulate matter emissions. While this relationship varies among different emission source categories, depending on a number of factors, within a specific emission source category, such as recovery furnaces, opacity can be directly related to particulate emissions, depending only on the width or thickness of the plume.

Consequently, reduction of particulate emissions to a certain level will result in the reduction of the opacity of visible emissions to a certain level, except in very few situations, such as the use of an unusually large diameter stack. Visible emission standards are established at levels consistent with the associated particulate emission standard. Thus, the opacity standard is no more stringent than the particulate emission standard and achievement of the particulate emission standard will ensure achievement of the associated visible emission standard. In developing the visible emission standard, the diameter of existing recovery furnace stacks within the kraft pulp industry was surveyed and the diameter of the typical stack that might be built in the future was estimated. All the data were adjusted to this stack diameter and the opacity emission limit selected on this basis. The opacity limit in the visible emission standard, therefore, is a conservative value and should not present any problem to a recovery furnace in compliance with the promulgated particulate emission standard. In those few cases where this is not true, such as the use of an unusually large diameter stack, relief from the opacity standard is provided by 40 CFR 60.11(e).

Smelt dissolving tanks:

Numerous comments were received concerning the format of the proposed TRS and particulate emission standards for smelt dissolving tanks. These comments pointed out that standards in terms of emissions per unit of air-dried pulp were inequitable for kraft pulp mills which produced low-yield

pulps since both TRS and particulate emissions from the smelt dissolving tanks are proportional to the tons of black liquor solids fed into the tanks. The black liquor solids produced per ton of air-dried pulp, however, can vary substantially from mill to mill. A standard in terms of emissions per unit of air-dried pulp, therefore, requires greater control of emissions at kraft pulp mills which use low-yield pulps (higher solids-to-pulp ratio). In addition, some commenters were concerned that air-dried pulp production rates corresponding to particular emission periods would be difficult to determine.

After reviewing these comments, it is clear that the format of the proposed standards was inequitable. The format of the promulgated standards, therefore, has been revised to emissions per unit of black liquor solids fed to the smelt dissolving tanks. Using the industry average of 3000 pounds of black liquor solids (dry weight) per ton of air-dried pulp, the numerical emission limits in the proposed standards were converted to the units of the promulgated standards. The promulgated standards limit TRS emissions to 0.0084 gram per kilogram of black liquor solids (dry weight) and particulate emissions to 0.10 gram per kilogram of black liquor solids (dry weight). Since the percent solids and black liquor flow rate to the recovery furnace is routinely monitored at kraft pulp mills, the weight of black liquor solids corresponding to a particular emissions period will be easy to determine.

Brown stock washer and black liquor oxidation:

Several commenters expressed concern about combustion of the high volume-low TRS concentration discharged from brown stock washers and black liquor oxidation facilities in recovery furnaces without facing a serious risk of explosions. As discussed in the SSEIS, information

obtained from two kraft pulp mill operators indicates that this practice is both safe and reliable when it is accompanied by careful engineering and operating practices. Danger of flashback due to a high volume of gas (low in TRS) being introduced into the recovery furnace is effectively eradicated by venting the gases high in the furnace. Problems arising from the introduction of high moisture content gases into the furnace are also eased by not venting the gases at lower ports and use of a condenser before the recovery furnace. Since some older furnaces do not have the capability to accept large volumes of gases at the higher ports, however, the practice may not be safe for some existing furnaces. In addition, the costs associated with the extra ducts, providing corrosion resistance and installing a condenser are frequently prohibitive for a modified or reconstructed facility as is the cost of building a separate incinerator. Consequently, the proposed and promulgated standards include an exemption for new, modified, or reconstructed brown stock washers and black liquor oxidation facilities within existing kraft pulp mills where combustion of the waste gases released from these facilities is not feasible from a safety or economic standpoint.

2.3 CONTINUOUS MONITORING AND EXCESS EMISSIONS

Continuous monitoring:

Numerous comments were received concerning the proposed continuous monitoring requirements. Generally, these comments questioned: (a) the requirement to install TRS monitors in light of the absence of performance specifications for these monitors, (b) the usefulness of opacity monitors and scrubber pressure drop monitors in various situations, (c) the need for oxygen monitors, and (d) the usefulness of monitoring incineration firebox temperatures.

At the time of proposal of the standards, both EPA and the kraft pulp mill industry were engaged in developing performance specifications for TRS continuous emission monitoring systems. It was expected that this work would lead to performance specifications for these monitoring systems by the time the standards of performance were promulgated. Unfortunately, this is not the case. In a joint EPA/industry effort, the compatibility of various TRS emission monitors with Reference Method 16, which is the performance test method used to determine TRS emissions, is still under study. There is little doubt that these TRS emission monitoring systems will be shown to be compatible with Reference Method 16, and that performance specifications for these systems will be developed. Consequently, the promulgated standards include TRS continuous emission monitoring requirements. The monitoring equipment, however, will not have to be installed until after the performance specifications have been proposed and promulgated. To accomodate this situation, not only for the promulgated standards for kraft pulp mills, but also for standards of that may be developed in the future that may also face this situation, section 60.13 of the General Provisions for Subpart 60 is ammended to provide that continuous monitoring systems need not be installed until performance specifications for these systems are promulgated under Appendix B to Subpart 60. This will ensure that all facilities which come under the standards of performance before the monitoring system performance specifications are promulgated will make the necessary provisions for and eventually install a continuous emission monitoring system.

With regard to the usefulness of opacity and scrubber pressure drop monitors, the commenters pointed out that opacity monitors would not be

useful on recovery furnaces equipped with scrubbers to control particulate emissions, and that monitoring scrubber liquid flow rate would be more convenient than scrubber pressure drop.

Opacity monitoring is not appropriate where recovery furnaces are equipped with scrubbers to control particulate emissions, due to the interference of moisture present in the waste gases discharged to the atmosphere. Accordingly, the promulgated standards have been revised to require monitoring of the pressure drop across the scrubber in these situations.

It is true that monitoring the scrubber liquid flow rate would be easier than monitoring the pressure drop across the scrubber. Pressure drop, however, is a more direct indicator of proper operation and maintenance of the scrubber than liquid flow rate. Consequently, the promulgated standards require continuous monitoring of the scrubber pressure drop.

The promulgated standards also require continuous monitoring of oxygen in the waste gases discharged to the atmosphere. Since the TRS numerical emission limit is expressed in terms of concentration and significant variations in the oxygen content of the waste gases discharged to the atmosphere were observed among various facilities, any determination of TRS emissions must be referenced to a common basis to make the results meaningful. This also precludes circumvention of the TRS standards by dilution with air to reduce the measured TRS emission concentrations.

Although oxygen monitors are necessary immediately following the recovery furnace and the lime kiln to permit good process operation of these facilities in order to properly account for the possibility of dilution air the concentration of oxygen must be determined at the

same point as the concentration of TRS emissions. Consequently, the standards may indeed require two continuous oxygen monitors in many cases.

Concerning the usefulness of monitoring the firebox temperature when a separate incinerator is employed to control TRS emissions from the digester, multiple-effect evaporator, condensate stripper, brown stock washer, or black liquor oxidation systems, a review of the basis for this requirement indicates the commenters are correct. Firebox temperature is only one of the factors influencing TRS emissions and high firebox temperatures do not necessarily mean low TRS emissions. Therefore, the standard has been revised to require continuous TRS emission monitoring in those cases where interference from other gases is not a problem. Temperature monitoring requirements, however, remain for those cases where it is not feasible to monitor TRS emissions directly.

Excess emissions:

It was apparent from the comments that were submitted on the proposed excess emission reporting requirements that a number of commenters did not understand the concept of excess emissions. Consequently, a brief review of this subject is appropriate.

Standards of performance have two major objectives. The first is installation of the best system of emission reduction, considering costs; and the second is continued proper operation and maintenance of this system of emission reduction throughout its useful life. Since the numerical emission limit included in standards of performance is selected to reflect the performance of the best system of emission reduction under conditions of proper operation and maintenance, the performance test, under 40 CFR 60.8 represents the ability of the source to meet these

objectives. Performance tests, however, are often time consuming and complex, frequently requiring three to four weeks of lead time for planning and scheduling, a week for the actual testing itself, and two to three weeks of lag time until the results are available and verified. Performance tests are also sufficiently expensive, costing from $10,000 to $20,000 per test, to preclude their frequent use. As a result, while the performance test is an excellent mechanism for achieving these objectives, it is rather cumbersome and inconvenient for routinely achieving these objectives. Therefore the Agency believes that continuous monitors must play an important role in meeting these objectives.

Excess emissions are defined as emissions exceeding the numerical emission limit included in a standard of performance. Continous emission monitoring, therefore, can identify periods of excess emissions and when combined with the requirement that these periods be reported to EPA, it provides the Agency with a useful mechanism for achieving the previously mentioned objectives.

Continuous emission monitoring, however, will identify all periods of excess emissions, including those which are not the result of improper operation and maintenance. Excess emissions due to start-ups, shutdowns, and malfunctions, for example, are unavoidable or beyond the control of an owner or operator and cannot be attributed to improper operation and maintenance. Similarly, excess emissions as a result of some inherent variability or fluctuation within a process which influences emissions cannot be attributed to improper operation and maintenance, unless these fluctuations could be controlled by more carefully attenting to those process operating parameters during routine operation which have little effect on operation of the process, but which may have a significant effect on emissions.

To quantify the potential for excess emissions due to inherent variability in a process, continuous emission monitoring data are used whenever possible to calculate an excess emission allowance. For kraft pulp mills, this allowance is defined as follows. If a calendar quarter is divided into discrete contiguous twelve-hour time periods, the excess emission allowance is expressed as the percentage of these time periods excess emissions may occur as the result of unavoidable variability within the kraft pulping process. Thus, the excess emissions allowance represents the potential for excess emissions under conditions of proper operation and maintenance, in the absence of start-ups, shutdowns, and malfunctions, and is used as a guideline or screening mechanism for interpreting the data generated by the excess emission reporting requirements.

Although the excess emission reporting requirements provide a mechanism for achieving the objective of proper operation and maintenance of the best system of emission reduction, this mechanism is not necessarily a direct indicator of improper operation and maintenance. Consequently, excess emission reports must be reviewed and interpreted for proper decisionmaking.

Each of the excess emission reports submitted at the end of a calendar quarter will be reviewed. This review may lead to no action, or it may lead to a visit to the emission source to conduct a preliminary assessment of the operation and maintenance of the emission control system. If improper operation or maintenance is suspected, this visit may be followed by additional investigation to document specific examples of improper operation and maintenance and a performance test. Depending on the results obtained from these actions, the owner or operator of the emission source may be charged with a violation of the proper operation and maintenance requirements included in the general provisions applicable

to all standards of performance, and/or a violation of the numerical emission limit included in the standard of performance. A performance test would in most cases be required to support sanctions for violations of the numerical emission limit, but not necessarily required to support a violation of the proper operation and maintenance requirements.

The proposed standards would have required only the reporting of excess emissions which were the result of start-ups, shutdowns, and malfunctions, and excess emissions above the excess emission allowance. This is not consistent with the overall concept of excess emissions, as discussed above, and the promulgated standards have been revised to require the reporting of all excess emissions. In addition to providing a more complete picture concerning the day-to-day operation of a kraft pulp mill, this simplifies the excess emission reporting requirements and interpretation of the data.

In general, the comments received concerning the excess emission reporting requirements questioned: (1) the adequacy of the TRS excess emission allowance for lime kilns and (2) the lack of a TRS excess emission allowance for recovery furnaces.

With regard to the adequacy of the TRS excess emissions allowance for lime kilns, an analysis of the TRS emission data from lime kiln E has led to a revision of the TRS emission standard from 5 ppm to 8 ppm, as discussed earlier in this chapter. This analysis also indicates that an excess emission allowance is not appropriate at a TRS emission level of 8 ppm. Accordingly, the excess emission reporting requirements included in the promulgated standard for lime kilns contains no excess emission allowance. This does not represent a change in the basis of the standard.

The stanard will still require installation of the best system of emission reduction, considering costs (i.e., efficient mud washing, good lime kiln process operation, and caustic scrubbing; or an alternative system equivalent to the performance of this system).

With regard to the lack of a TRS excess emission allowance for recovery furnaces, at the time of proposal of the standards, no TRS continuous emission monitoring data were available from a well controlled and well operated recovery furnace which could be used to determine an excess emission allowance. Several months of TRS continuous emission monitoring data, however, were submitted with the comments received from the operator of recovery furnace D concerning this point.

As discussed in the SSEIS, recovery furnace D is a straight kraft, direct-contact furnace which employs good process operation of the recovery furnace and good black liquor oxidation facilities to reduce TRS emissions (i.e., the best system of emission reduction, considering costs). An inspection of the TRS continuous emission monitoring system indicated that it was properly operated and maintained and produced an accurate record of TRS emissions. These data, therefore, were used to select an appropriate excess emission allowance.

A review of the data indicates that, while some of the excursions of TRS emissions above 5 ppm reflected either improper operation and maintenance, or start-ups, shutdowns, or malfunctions, most of these excursions reflected unavoidable normal variability in the operation of a kraft pulp mill recovery furnace. Discounting those excursions in emissions from the data which were due to improper operation and maintenance, or start-ups, shutdowns, or malfunctions indicates that an excess emission allowance of 1 percent is appropriate at a TRS emission level of 5 ppm.

As discussed in the section of this chapter concerning emission control technology, the promulgated TRS standard for recovery furnaces has been revised to include a separate numerical emission limit of 25 ppm for cross recovery furnaces. A review of the data and information available on recovery furnaces in general indicates that the excess emission allowance developed for straight kraft recovery furnaces is also appropriate for cross recovery furnaces. Consequently, the excess emission reporting requirements included in the promulgated standards for all recovery furnaces contains an excess emission allowance of 1 percent.

Including an excess emission allowance in the excess emission reporting requirements associated with the promulgated standards for recovery furnaces, but not including such an allowance for lime kilns, represents a reversal of the proposed requirements. However, this reversal is consistent with the nature of the different emission control systems which were selected as the bases for these standards. The emission control system upon which the TRS standard for recovery furnaces is based consists of black liquor oxidation and good process operation of the recovery furnace for direct recovery furnaces, and good process operation alone for indirect recovery furnaces. Neither of these emission control systems are particularly well suited to controlling fluctuations in TRS emissions due to fluctuations in the kraft pulping process. Thus, fluctuations in the process tend to pass through the emission control system and show up as fluctuations in TRS emissions.

The emission control system upon which the TRS standard for lime kilns is based consists of efficient mud washing, good process operation of the lime kiln, and caustic scrubbing of the gases discharged from the

lime kiln. As with the emission control system upon which the standard for recovery furnaces is based, the first two emission control techniques (i.e., mud washing and good process operation) are not particularly well suited to controlling fluctuations in TRS emissions due to fluctuations in the kraft pulping process. The third emission control technique, however, caustic scrubbing, is an "add-on" emission control technique that can be designed to accommodate fluctuations in TRS emissions and minimize or essentially eliminate these fluctuations.

2.4 EMISSION TESTING

Most of the comments received concerning the proposed reference methods for determining TRS and particulate emissions questioned various aspects of the use of Reference Method 16 and the basis for Reference Method 17.

Reference Method 16:

With regard to Reference Method 16 for determining TRS emissions, the comments questioned: (1) if equipment other than that specified in the proposed method could be used to determine emissions; (2) the costs associated with using Reference Method 16 to determine emissions; (3) the validity of the results obtained by Reference Method 16, due to sample losses and sulfur dioxide (SO_2) interference; and (4) the need for measuring the concentration of all reduced sulfur compounds rather than just the four principle components of TRS.

The emission measurement system included in the promulgated Reference Method 16 is the same as that included in the proposed reference method for determining TRS emissions. The method has been revised, however, to permit the use of equipment other than that specified in the EPA emission

measurement system, provided this equipment employs the same analytical principles to measure TRS emissions as the equipment included in the EPA system, and that the alternative emission measurement system meets the various performance specifications included in the promulgated reference method. The promulgated reference method was not revised to permit the use of an alternate method, however, because the use of alternative methods is already addressed in 40 CFR 60.8.

The costs associated with the use of Reference Method 16 to determine TRS emissions are reasonable and would not be prohibitive for State or local air pollution control agencies or kraft pulp mills. For example, the costs of a performance test to determine emissions from the lime kiln, the recovery furnace, and the smelt dissolving tanks at a kraft pulp mill using Reference Method 16 would only be about $10,000 using a competent emission testing contractor. If a State or local agency or kraft pulp mill were to purchase the necessary equipment to do the testing themselves, this would cost about $15,000. The cost of operating this equipment, including personnel labor costs during the test, would probably not exceed $15,000.

With regard to the validity of the results obtained by Reference Method 16, as discussed in the section of this chapter concerning emission control technology, it was not known that sample losses could occur within the TRS emission measurement system during development of the proposed standard. Since proposal of the standards, however, it has been found that sample losses of up to 20 percent may have occurred during emission source testing. Although these losses were not considered in selecting the numerical emission limits included in the proposed TRS emission standards, they have been considered in selecting the numerical emission limit included in the promulgated standards.

Also, since the amount of sample loss that occurs within the TRS emission measurement system during source testing can be determined, procedures have been added to Reference Method 16 requiring determination of these losses during each source test and adjustment of the emission data obtained to take these losses into account. This will ensure that the TRS emission data obtained during a performance test are accurate.

It has also been confirmed that high concentrations of SO_2 will interfere with the determination of TRS emissions to some extent. At this point, however, it is not known what SO_2 concentration levels will result in a significant loss of accuracy in determining TRS emissions. The ability of a citrate scrubber to selectively remove SO_2 prior to measurement of TRS emissions is currently being tested. In addition, various chromatographic columns might exist which would effectively resolve this problem. As soon as an appropriate technique is developed to overcome this problem, Reference Method 16 will be amended.

This problem will not present major difficulties to the use of Reference Method 16. Relatively high SO_2 concentration levels were only observed in one EPA emission test. Accordingly, high SO_2 concentration levels are probably not a frequent occurrence within kraft pulp mills. More importantly, however, high SO_2 concentrations only interfere with the determination of methyl mercaptan in the emission measurement system outlined in Reference Method 16. Since methyl mercaptan is usually only a small contributor to total TRS emissions, neglecting methyl mercaptan where this interference occurs should not seriously affect the determination of TRS emissions. Consequently, Reference Method 16 can be used to enforce the promulgated standards without major difficulties.

In response to the comments questioning the need to determine the concentration of all TRS emissions, the definition of TRS in the promulgated standards has been revised to include only hydrogen sulfide, methyl mercaptan, dimethyl sulfide, and dimethyl disulfide. There is no evidence to indicate that kraft pulp mills emit significant amounts of any other reduced sulfur compounds and this revision will reduce the complexity of using Reference Method 16.

Reference Method 17:

With regard to Reference Method 17 for determining particulate matter emissions from recovery furnaces, the comments questioned: (1) the basis for accepting Reference Method 17 as equivalent to Reference Method 5 and (2) the inconsistency between Reference 5 and Reference Method 17 regarding the acceptability of non-isokinetic results.

While Reference Method 5 was employed to obtain the emission data supporting the particulate emission standard for recovery furnaces, a substantial amount of comparative data have been collected which provide a basis for determining the relationship between Reference Method 5 and Reference Method 17. These data are included in "Comparison of Source Particulate Emission Measurement Methods at Kraft Recovery Furnace Stacks," Atmospheric Quality Improvement Technical Bulletin No. 67, National Council of the Paper Industry for Air and Stream Improvement, Inc., 260 Madison Avenue, New York, New York 10016, October, 1973.

In response to the comments questioning the inconsistency between Reference Method 5 and Reference Method 17 regarding the acceptability of results obtained from non-isokinetic sampling, Reference Method 5 has been amended to be consistent with Reference Method 17. Guidance for determining the acceptability of results obtained from non-isokinetic

sampling may be obtained by writing to Don R. Goodwin, Director, Emission Standards and Engineering Division, Mail Drop 13, Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

2.5 MISCELLANEOUS

There were numerous minor questions, requests for clarification, and suggestions submitted by the commenters. All were given proper consideration. The most significant of these miscellaneous comments concerned the following issues: (1) the U.S. Supreme Court settlement involving International Paper Company, the State of New York, and the State of Vermont; (2) the effects of the standards on further technological development; (3) the possibility of separate standards for kraft pulp mills located in remote areas; and (4) the applicability of the existing fossil fuel-fired steam generator standards of performance to kraft pulp mills.

The agreement of settlement between the State of Vermont, the State of New York, and International Paper Company (IPCO), which was approved by the U.S. Supreme Court on October 29, 1974, stated that EPA could not use the emission limitations agreed upon between the involved parties as a basis for "emission regulations with respect to the bleached kraft pulp and paper industry." One commenter stated that this agreement is being circumventing by making reference to the IPCO mill in the SSEIS and requested that these references be removed.

The agreement has not been circumvented. The references were included for completeness only and no information or emission data from

the IPCO mill was used in developing either the proposed or the promulgated standards of performance for kraft pulp mills.

A few commenters were concerned that the standards of performance might stifle further technological progress within the kraft pulp industry. These commenters were under the mistaken impression that the standards specified the use of certain technology. As a result, they recommended that the standards merely specify emission limitations.

This is, in fact, all that standards of performance specify, a reduction of emissions to certain levels. In developing the numerical emission limits included in standards of performance, each of the alternative control systems which could be used to reduce emissions is studied. Based on this analysis, one or more of these systems are selected as the best system of emission reduction, considering costs. This system then serves as the basis for the standard of performance. While the capability of this system to reduce emissions establishes the numerical emission limit included in the standard, the standard does not require the use of this emission control system, only the reduction of emissions to the specified emission levels.

With regard to the possibility of separate standards of performance for kraft pulp mills located in remote areas, section 111 does not provide flexibility to develop standards of performance which would vary with geographic location. One of the primary objectives of the Congress in section 111 is to prevent the emergence of new air pollution problems by requiring the installation of the best systems of emission reduction in all cases. Separate standards for remote sources of air pollution would not be consistent with this objective.

Following proposal of standards of performance for kraft pulp mills, the existing standards of performance for fossil fuel-fired steam generators were

amended to limit emissions from units firing wood residue or wood residue in combustion with other fossil fuels. Consequently, new, modified, or reconstructed fossil fuel-fired steam generators within kraft pulp mills firing greater than 73 megawatts (250 million Btu per hour) of gas, oil, coal, wood residue, or any combination of these fuels will be subject to compliance with these standards.

TABLE 2-1

LIST OF COMMENTERS ON THE PROPOSED STANDARDS OF PERFORMANCE FOR KRAFT PULP MILLS - SEPTEMBER 24, 1976 (41 FR 42012)

COMMENTER AND AFFILIATION

E. V. Fitzpatrick - EPA Region I

Harold E. Hodges - Dept. of Public Health, State of Tennessee

George H. Whiteside - Container Corp. of America

John Robinson - Kirby Lumber Co.

V. J. Tretter - Georgia-Pacific Corp.

James E. Walther - Crown Zellerbach Environmental Services

J. W. Klein - Longview Fibre Co.

Joseph R. Rippee - Potlatch Corp.

Paul M. Utterback - Babcock & Wilcox

Harry H. Hovey, Jr. - N. Y. State Dept. of Environmental Conservation

W. R. Meyer - State Air Control Board, Commonwealth of Virginia

James K. Hambright - Dept. of Environmental Resources, Commonwealth of Pennsylvania

C. W. Conaway - Industrial Risk Insurers

Mike Trykoski - Commonwealth Edison

Boris J. Osheroff - Public Health Service, DHEW

S. J. Kruger - The Buckeye Cellulose Corp.

C. Neal Carter, Ph.D. - P. H. Glatfelter Co.

Jerry M. Stubberfield - Air & Water Pollution Control Commission, State of Mississippi

Sidney R. Galler - U.S. Dept. of Commerce

Joseph Kolberg - Boise Cascade/Paper Group

TABLE 2-1 (cont.)

COMMENTER AND AFFILIATION

Steven K. Starkey - Private Citizen

Sergio F. Galeano, Ph.D. - Owens-Illinois

Michael J. Gannam - Attorney at Law, Savannah, Georgia

H. R. Emery - St. Regis Paper Co.

James A. McColman - Division of Environmental Management, N. C. Dept. of Natural & Economic Resources

C. M. Williams - Brown Co.

Paul E. Trout - Container Corp. of America

Larry Weeks - Hoerner Waldorf Corp.

C. R. Duffie - Willamette Industries

T. C. Payne - International Paper Co.

C. R. Calkins - American Paper Institute, Inc.

Russell E. Kross - The Mead Corp.

Francis J. Milotich - Scott Paper Co.

Richard C. Wigger - Champion International

Russell O. Blosser - National Council of the Paper Industry for Air & Stream Improvement, Inc.

Robert H. Collom, Jr. - Dept. of Natural Resources, State of Georgia

James W. Cooper - Alabama Air Pollution Control Commission

Leslie Carothers - EPA Region I

David Lutrick - Ekono Inc.

Peter E. Wrist - Mead

J. C. Cuthbertson - American Can Co.